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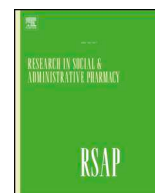
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How are medication related problems managed in primary care? An exploratory study in patients with diabetes and primary care providers

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ABSTRACT

Background: Medication self-management is important for patients who are controlling diabetes. Achieving medication self-management goals, may depend on treatment complexity and patients' capacities such as health literacy, knowledge and attitude.

Objectives: The aims of this study were to explore how patients with diabetes self-manage their medications, how patients seek support when experiencing problems and how primary healthcare providers identify patients' medication related problems and provide support.

Methods: Semi-structured interviews were conducted among patients with diabetes receiving primary care and with their primary healthcare providers – GPs, nurses, pharmacists and technicians – between January and June 2017. A purposive sampling strategy was used to identify and select participants. An interview guide based on the Cycle of Complexity model was developed. Interviews were audiotaped and transcribed verbatim. Transcripts were coded with a combination of deductive and inductive codes. A thematic analysis was performed to identify categories and themes in the data. Findings were compared with the Cycle of Complexity model.

Results: Twelve patients and 27 healthcare providers were included in the study. From the transcripts 95 codes, 6 categories and 2 major themes were extracted. Patients used practical solutions and gaining knowledge to manage their medication. Their problems were often related to stress and concerns about using medications. A trusted relationship with the healthcare provider was essential for patients to share problems and ask for support. Informal support was sought from family and peer-patients. Healthcare providers perceive problem identification as challenging. They relied on patients coming forward, computer notifications, clinical parameters and gut-feeling. Healthcare providers were able to offer appropriate support if a medication management problem was known.

Conclusion: Patients are confident of finding their way to manage their medications. However, sharing problems with healthcare providers requires a trusted relationship. This is acknowledged by both patients and healthcare providers.

Background

Self-management is an important element for patients to control their diabetes. Self-management is an "individual's ability to manage symptoms, treatment, physical and psychosocial consequences and life style changes inherent in living with a chronic condition".¹ The extent to which patients with diabetes are able to perform self-management

depends on treatment complexity, their health literacy, diabetes- and medication-related knowledge and attitude.^{2–4} Treatment complexity in patients with diabetes often comprises the complex treatment of diabetes itself and the therapy for comorbidities. Approximately 85% of all patients with diabetes have at least one comorbidity and 25% have four or more comorbidities.^{5–8} This leads to increased use of both primary and hospital healthcare.^{7,9} Treatment complexity is also positively

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correlated with therapy non-adherence, risk for medication related problems, and reduced patients' self-management capacities.^{10–18} Health literacy – one's ability to access, understand, appraise and apply health information across the different aspects of healthcare – is related to patients' self-management capacity and influences disease and treatment awareness.^{19,20} Lower health literacy levels negatively affect patients' self-management capacities as well as patients' low illness perceptions.^{20,21} These factors could impact patients with diabetes to have inadequate medication self-management and morbidity.

Patients with diabetes have problems with medication self-management.²² In addition to complex treatment regimens and the aforementioned patient characteristics, self-management problems could be associated with patients' dissatisfaction with therapy, drug related problems, or decision making about how to use the prescribed therapy.^{10–13,23,24} Whereas self-management in itself is dependent on a patients' network and feeling of support from the environment.²⁵ Patients with diabetes can obtain information from many sources about prescribed therapy and medication management, including searching the internet and approaching healthcare providers.²² Community pharmacists are easily accessible and play an important role in improving self-management and clinical outcomes and reducing medication related problems among patients with diabetes.^{26,27} Physicians and nurses have demonstrated their added value in educating patients about self-management to improve diabetes outcomes.^{28,29} Triggers for information seeking behaviour of patients and preferred sources of information for different kind of questions is lacking.²² Healthcare providers use many tools to identify medication related problems: clinical decision support systems, professional judgement, current guidelines, patient surveys, and computerized support systems. Though, the role of communication between patients and healthcare providers is underserved in identifying medication related problems.^{30–32} Some patients experience time constraints and traditional, paternalistic attitudes when approaching healthcare providers for information and consultation.^{33,34} It is unknown how these experiences influences patients' choices and behaviour in case of medication related problems.

From the current literature it is unknown when, what and from whom patients with diabetes seek support in case of medication management problems. Also little is known how primary healthcare providers consider support for different kinds of problems. The aims of this study are to further explore how patients with diabetes self-manage their medications, how they seek support when experiencing problems, as well as to explore how primary healthcare providers identify medication related problems in patients with diabetes and how they support this group of patients. All explorations are done according to the cycle of complexity model.

Theoretical background

As discussed in the introduction, self-management of medication and disease is influenced by many factors, including comorbidities, network and social well-being. The cycle of complexity model is a theoretical framework illustrating how these factors are related to each other and how they can affect a patient's experience of health.³⁵ The cycle of complexity model (Fig. 1) considers aspects that are important for patients with multiple chronic conditions. "Preferences and expectations" of the patient are the central focus point. The current study focused on the four components closest to the patient's health, namely acute shocks and medical events, workload, capacity and resilience and access and utilization. These four themes were used to develop the topic list for the interviews. Acute shocks and medical events include both positive and negative events that might occur in a patient's life. In this current study patients were asked about other medical conditions besides their diabetes that might influence medication management. This could either relate to themselves or a close relative. The workload refers to all the effort a patient has to make to manage daily activities, including their medical conditions. For example, how did they fit in

medication management into their daily life? Capacity and resilience refers to all the abilities and resources a patient has to manage for their medical conditions and assigned therapy. Do they experience any kind of support from their environment? Access and utilization includes both the physical and social distance to healthcare as experienced by patients. Can patients easily approach their healthcare providers if they have any questions or problems? Changes in any of the components could affect the experience of burden of treatment and the burden of illness and could either increase or decrease a patient's medical complexity.

The use of this model initiated a more holistic approach of medication management problems. The model was applied in the development of the interview guide to prepare topics in the different aspects presented in the model. Presentation of the results were guided by the model to structure the participants' responses. In the discussion, the current findings were compared with the main topics presented in the model and how they played a role among the participants. The use of this model may have narrowed the scope of this study, though the exploratory nature of this study gave all participants the space to express themselves fully.

Although data have been collected among all the different aspects presented in the model, this manuscript focusses on workload, capacity and resilience, and access and utilization.

Methods

Study design

Qualitative semi-structured interviews were conducted to explore the aims of this study. Patient interviews took place at the patient's home or – on patient's request – in a private consultation area in a GP practice. Healthcare provider interviews took place at their workplace.

Study setting

All participants in the study were part of the primary healthcare system in the Netherlands, either as healthcare provider – general practitioner, nurse practitioner, community pharmacist or pharmacy technician – or as patient treated in primary care.

In the Netherlands, where all citizens are assigned to one particular general practice, diabetes care for patients with uncomplicated diabetes type 2 is arranged through the general practice in diabetes care groups, a group of healthcare providers together responsible for the chronic diabetes care.^{36,37} According to protocol, patients have regular appointments with a nurse practitioner or diabetes nurse every three months. The nurse discusses the patient's clinical parameters, general well-being and asks about possible problems with life style adaptations and medication use. Once a year patients with diabetes are seen by their general practitioner for a more thorough check-up.³⁸ Dutch community pharmacies provide a wide variety of services to patients.³⁹ Patients are usually registered in one particular community pharmacy. Ambulatory patients have the majority of their medications dispensed at their registered community pharmacy. Most pharmacies frequently request additional clinical parameters from the general practice. Therefore, pharmacy staff is able to accurately monitor a patient's medication, provide patients with appropriate guidance and information about medication use and build a sustainable relationship with the patient.

Sampling strategy

A purposive sampling strategy was used. Recruitment started with pharmacists in different regions. Participating pharmacists were asked for names of their general practitioners and nurse practitioners collaborations for snowball sampling. This led to the inclusion of a sample of primary healthcare providers from different geographical regions, who had different practice characteristics, and personal characteristics.

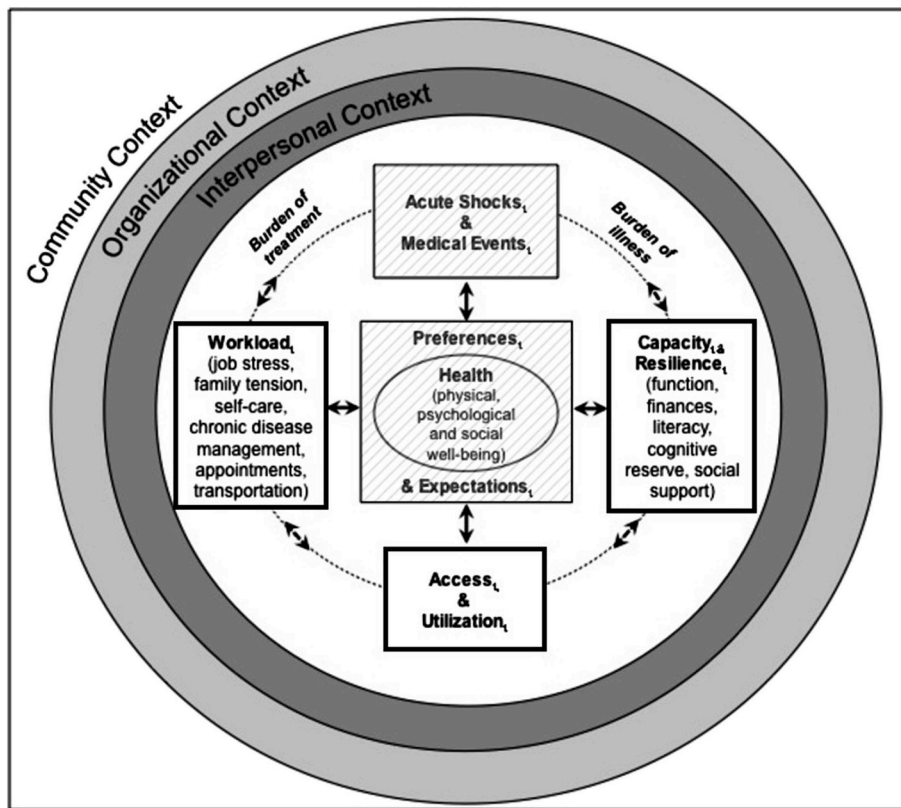


Fig. 1. Aspects addressed of Cycle of Complexity Model.³⁵ Reprinted by permission from Springer Nature Customer Service Centre GmbH: Springer Nature. Journal of General Internal Medicine. A systematic review of conceptual frameworks of medical complexity and new model development, Zullig LL, Whitson HE, Hastings SN, Beadles C, Kravchenko J, Akushevich I, Maciejewski ML, 2015.

Patients were recruited through primary healthcare providers and basic Dutch language courses offered by local libraries. At the end of the interview with the healthcare providers they were asked for eligible patients in their practice. No specific patient cases were discussed with the healthcare providers related to their own patients. Dutch speaking patients with diabetes were sampled and purposively included patients with at least one of the following characteristics: low literacy, low health literacy, known diabetes medication related problems or concerns, multi-morbidity or diabetes therapy adherence related problems. Except for low literacy, patients meeting the inclusion criteria were based on healthcare provider's professional judgement. The eligibility criteria were discussed with the healthcare provider to assess their understanding of the terms. Low literacy was assumed if patients were enrolled in a basic language course for low literates. The language courses focused mainly on low literate native Dutch speakers. Patients approached through language courses were eligible if they were familiar with a diagnoses of diabetes.

Sampling continued until saturation was reached. Saturation was assumed when no new answers or topics were identified in two consecutive interviews. Saturation was assessed for patients, GP staff (general practitioners and nurse practitioners) and pharmacy staff (pharmacists and pharmacy technicians) separately.

Instruments and data collection

An interview guide was used for conducting the interviews. This guide was developed according to the cycle of complexity model for multi-morbid patients.³⁵ The interview guides are presented in Supplementary file 1. Conducting the interviews was an iterative process, new topics and answers arising from previous interviews were introduced in upcoming interviews. New topics only emerged during the first few interviews and could be discussed in a sufficient number of interviews. All interviews were conducted by LvE. She had neither personal nor professional relationships with the interviewees. Data were collected between January and June 2017.

Data processing and analysis

All interviews were audiotaped and transcribed verbatim using the software F4 Transkript. The transcripts were coded and analysed in Atlas.ti 7.5.18. Coding was performed with a combination of deductive and inductive codes. Deductive codes were derived from the topics used in the interview guide and the inductive codes from the interviews itself. The coding was carried out in two steps. First more general and broad codes were applied. Second, subcodes were added for nuancing the results and to be able to perform a proper thematic analysis.⁴⁰ All codes are presented in Supplementary file 1. After the coding, a thematic analysis was performed according to the theory of Julie Green et al.⁴¹ This theory describes a four steps approach to summarise data from qualitative sources; (1) data immersion, (2) coding, (3) creating categories and (4) identifying themes. The first author, LvE, coded all the interviews. Coding was developed in agreement with HdG, KT and LvD. A double check was performed for half of the interviews by HdG, KT and LvD. Coded fragments to be included in the analyses were reviewed by KT and LvD. Any disagreements were solved by discussion. Findings of the study were compared to the Cycle of Complexity model.

Ethical statement and privacy

The medical ethical committee of the University Medical Centre Groningen in Groningen, the Netherlands determined that this research does not have to comply with the Medical Research Involving Human Subjects Act. The study has been registered in the University Medical Centre Groningen Research Register with study number 201600659. All participants in the study were informed prior to the interview and were given the opportunity to ask questions and request for additional information. All participants signed informed consent on the day of the interview. Data were stored on a secured server of the University of Groningen and all research material was provided with a study ID. The key to the study ID was electronically stored and secured with a password. Study data were only available to the primary researchers.

Table 1
Characteristics interviewed participants.

Patients		N = 12
Age		64.8 yrs (52–85)
Gender		50% female
Living situation		
Alone		41.7%, (n = 5)
With partner		41.7%, (n = 5)
With partner and children		16.7%, (n = 2)
Education		
Primary school		8.3%, (n = 1)
Secondary school		50%, (n = 6)
Vocational training		16.7%, (n = 2)
Degree university of applied sciences		16.7%, (n = 2)
Degree research university		8.3%, (n = 1)
Duration interview		43.7 min (17–70)
Healthcare providers		N = 27
Pharmacist		n = 11
Pharmacy technician		n = 5
General practitioner		n = 4
Nurse practitioner		n = 7
Age		46.0 yrs (23–71)
Gender		66.7% female
Years of experience		19.6 yrs (3–49)
Duration interview		38.0 min (21–56)

Results

Twelve patients were interviewed for this study, ranging from 52 to 85 years of age. Interviews lasted for 17 up to 70 min (Table 1). Twenty-seven healthcare providers were included; 11 pharmacists (PHA), 5 pharmacy technicians (TEC), 4 general practitioners (GP) and 7 nurse practitioners (NUR) (Table 1). These interviews lasted for 21–56 min and were conducted in their workplace, with the exception of one nurse interview (NUR007). Recruitment rates for patients and healthcare providers were respectively 80% and 47%. We extracted 95 codes, six categories and two major themes from the data. These themes were self-management – including the categories; practical problems and concerns about medicines, skills and knowledge and environmental influences – and accessibility of healthcare – including the categories; communication, support and problem identification. Results of the pharmacist and the technician were combined in this section because their responses were comparable and patients often spoke about the pharmacy in general without specifying with whom they had contact.

Self-management

Practical problems and concerns about medicines

Overall, patients reported coping well with the practical aspects of medicine use. Taking medications was not highly influenced by the number of medicines. Patients used different tools to assist themselves in taking medicines at the right time: using a pillbox, storing medications in the place of use or setting an alarm on a mobile phone. Patients reported that when they experienced stress – either work-related or due to private matters – or when they had concerns about using medication they had problems, including missing a dose, losing faith in therapy and side effects. Medication related concerns varied from an overall negative attitude towards using medication at all, previously experienced side effects or the perspective of having to use insulin in the future. These factors – experienced stress and concerns about medication – could be associated with either intentional or unintentional medication non-adherence. Many patients reported that adherence was important for good control of their diabetes, to avoid relapses in disease state and was even sometimes driven by fear. Some patients also mentioned the rewarding effects of good adherence, like improvement of their clinical parameters and maintenance of a good quality of life. Though,

adherence remained also challenging because of different distractions and disruptions in daily routines that could appear unexpectedly.

“And if, if you do not have the discipline of regularity, well then your medicines won't be very effective. That's the difficulty of taking medicines.” (Patient, Male, 67 yrs).

While patients reported few problems with practical issues, pharmacy staff indicated they most often received questions from patients with diabetes related to the practical barriers with regard to medication use and controlling diabetes. Patients reached out to the pharmacy for questions related to their blood glucose measurement device and testing materials, how to take their medication, refill prescriptions and medication management when losing track of their therapy. Sometimes patients presented questions regarding the side effects of medication, especially at the start of a new therapy or when switching to a different brand. Pharmacy staff also emphasized the negative effect of experiencing side effects on patient's medication adherence.

General practitioners also noted the occurrence of side effects. Both general practitioners and nurses described this as one of the main medication related problems among patients with diabetes affecting therapy adherence and clinical outcomes. Patients asked question in their general practice related to their therapy in general (e.g. possible changes in their medication). Patients also expressed concerns in the general practice, especially when consulting the nurse practitioner. Most concerns were related to initiating a new medication, having to use insulin in the future, and the impact of diabetes and medication use on daily life and their job.

“Often it's just practical questions; Do I take it before or after dinner? What kind of side-effects can I expect? Those are the most common questions.” (Technician, female, 30 yrs).

*“Sometimes people already have pictured their own reality. And then when you start explaining, you hear something like *pff..*, they sigh and start to relax. Oh, ok, well it is not as bad as I had imagined.” (Nurse, female, 56 yrs).*

Skills and knowledge

Patients' level of knowledge about diabetes and its treatment, and interest in improving their knowledge varied. However, for some patients, interest in gaining knowledge was a dynamic process that changed over time. After a period of acceptance patients usually developed a greater interest in medication management and increasing their general knowledge about diabetes and its treatment. Patients obtained information from leaflets, internet, and peers. Especially peers could be a motivating factor for increasing knowledge because patients did not want to be perceived as knowing less than their peers. Increasing knowledge empowered patients to realize the importance of appropriate therapy.

Pharmacy staff, general practitioners and nurse practitioners indicated patients' inadequate knowledge about medication and diabetes had an important impact on medication adherence and medication management. This inadequate knowledge also influenced the level to which patients were willing to accept information from healthcare providers and to what extent they were willing to cooperate with healthcare providers. A lack of knowledge impeded patients to understand the relation between appropriate therapy and improving diabetes outcomes. Furthermore, GPs and nurses indicated that concerns about diabetes were often related to a lack of knowledge about, for example, patients' fear of insulin therapy and the perception of severe complications. GPs and nurses primary concern was related to patients who understood that they were failing therapy but were withdrawing themselves from care. According to the GP staff, in some cases this might be related to patients being afraid of the healthcare provider's reaction to their failing therapy adherence.

Another factor indicated by all participating healthcare providers

was the influence of health literacy on patients' knowledge and how they handled their diabetes care. Patients with limited health literacy skills were not necessarily treated differently. When healthcare providers knew that patients had low health literacy, they would adapt information to meet the patient's literacy level. However, none of the healthcare providers formally assesses health literacy levels among their patients. Patients did not address their own health literacy levels.

"Of course, we have a couple of patients with whom it (the treatment red.) really doesn't work. That's often a combination of unknowing and not being able to understand." (GP, female, 49 yrs).

Environmental influences

Only two patients briefly mentioned the influence of their environment on their diabetes management. Both discussed the importance of understanding of diabetes at work. It is a patient's responsibility to inform their employer and co-workers if they want them to know something about the fact that they have diabetes and to enable them to offer support.

Healthcare providers emphasized the importance of the influence of patients' social environment on how patients handled their medication management. Problems in their living situation or at work might cause medication management not to be a main priority. Lifestyle habits like smoking or an unhealthy diet were also hard to break through if patients did not feel supported by relatives. Nurse practitioners clarified a patient's living situation. Sometimes a GP and occasionally pharmacy staff would also address living situation. Whether or not patients were open to share information depended on the nature of the underlying problem and the quality of the relationship with the healthcare provider.

"Yeah, trust is very important, yeah, very important. Because, well, it's (the medication red.) about something that keeps my body going. I mean, if you don't have trust, it (talking to a healthcare provider red.) becomes difficult." (Patient, male, 56 yrs).

Accessibility of healthcare

Communication

Patients experienced communication with primary healthcare providers differently. Most patients mentioned the nurse practitioner to be the first healthcare provider consulted in case of questions regarding diabetes or medication. Patients reported that their relationship with the nurse practitioner was the most familiar and that nurses were involved in their healthcare and took time to listen. In comparison, asking the GP placed a time burden on the patient. In the pharmacy, patients reported experiencing little privacy and an emotional distance between them and the pharmacy staff. Some patients indicated they felt pharmacy staff was not so much concerned about nor involved in their illness. Patients were sometimes reluctant to discuss personal questions in the pharmacy due to unpleasant experiences in the past. Though, for less private matters and more general healthcare questions the pharmacy was mentioned more frequently, mainly because of the accessibility of the pharmacy. Questions were often related to refill prescriptions, travelling with insulin and general health questions without urgency. Once patients felt more familiar with the pharmacy staff and the staff took time to answer questions adequately, patients were more open to communication.

"Yes, I like it, I think it's good that you get to know them (pharmacy staff red.). Also if you have questions – I also hear other people asking questions and then they take the time to look it up. So, yeah, I think that's very good, actually." (Patient, female, 64 yrs).

All groups of healthcare providers reported the importance of being aware of their communication with patients. Discussing sensitive topics – like lifestyle and medication adherence – required adaptation of their

communication style to the patients' preferences. Adjusting communication styles was repeatedly reported by pharmacists and pharmacy technicians and considered as very challenging. Especially when the pharmacy staff had the feeling patients responded evasively. Pharmacy staff indicated the importance of a good relationship with patients and knowledge of a patient's living situation for adequate communication between pharmacy staff and patients.

GPs and nurses emphasized the content of the communication. Consultations with patients were dynamic processes and required active involvement of both patient and healthcare provider. The healthcare provider should provide a safe environment for patients to ask questions and discuss health related issues. The information provided by the healthcare provider should answer the patient's question, but had to be concise and not overloading the patient with too much information. Regularly checking if the patient understood you benefitted both parties. It gave the patient the opportunity to ask more questions and it gave the healthcare provider the opportunity to give an additional explanation if necessary.

"I always try to build my stories based on the questions patients ask me. Because the sad thing is, it is chronic, it is never going away, but we also don't have to arrange everything within a week." (Nurse, female, 56 yrs).

"Well, you always try to explain things on the patient's level. Sometimes even that is not enough and then at a certain point, you know you can continue giving advice, but you have to be careful not to overload patients with information or to correct them." (Pharmacist, male, 29 yrs).

Support

Patients' medication management benefitted from a supportive environment. Patients indicated that family members living together with them were an important source of everyday support. Family members acted as reminders as well as mental support, not only for the medication management but also for secondary needs like keeping up a healthy lifestyle and looking up information. Patients living alone and without family nearby felt alone in their day-to-day needs. Another source of informal support were fellow patients. This peer support gave patients the feeling they were not alone and they were for once not the exception in a group.

"Yes, yes, yes, my husband worries about me, he worries a lot. He always keeps an eye on me." (Patient, female, 57 years).

"Well, tell me what you would like to know. And then he (husband) looks it up for me, well and then I get it." (Patient, female, 64 yrs).

Formal support from healthcare providers was mainly sought from the nurse practitioner. Not only for medication related problems, but also for psychosocial understanding. Patients had the feeling the nurse practitioner was the most engaged in their well-being. The pharmacist, technician and the GP had a less important role in this.

Healthcare providers reported to support patients with their medication related problems using three different main approaches. The first way was practical support by means of personalized medication distribution systems, adapting the medication regimen to the patient's schedule, medication refill services and instructions on how to use a blood glucose measurement device. The second method was to offer education about the effect of medication, the importance of adherence and the relationship between medication use and lifestyle and the way it affects a patient's health. Finally, healthcare providers reached out to a patient's informal caregivers. Caregivers could disclose additional information and could be an important channel to get information to a patient. All three different methods were mentioned by the different groups of healthcare providers. However, GPs and nurses had more affinity with general diabetes advice, lifestyle adaptations and contacting caregivers, whereas the pharmacy staff stayed closer to medication related advice and solving problems related to practical medication taking issues. They all highlighted the importance of tailoring

the advice to a patient's needs. Also, they emphasized patients should not be punished for mistakes made regarding their therapy. It was more important to disclose the cause of the mistakes and to find an appropriate solution.

"It's always baby steps, little things. But people are very hesitant about it. They think it's scary and they don't know where to begin. So then, I take them by the hand and hope for the best." (Nurse, female, 58 yrs).

Problem identification

For all healthcare providers part of the problem identification among patients with diabetes was simply asking the patient about any experienced problems or questions or if the patient introduced a problem or question without the healthcare provider having to ask for it.

Besides this direct way of problem identification, the different healthcare providers indicated the use of indirect methods. The main way for pharmacy staff to identify problems in patients with diabetes was through notifications from the pharmacy computer system. This system gave pop-ups if a patient came in too early or too late for a refill prescription. Less frequently used methods were discussing the medication list if a patient picks up a medication overview, an ever growing medication lists, patients who sounded confused, information provided by the medication delivery driver and gut-feeling of the pharmacy staff.

The GP and nurse focused on identifying the underlying issue of an observed problem. They used the observation to discuss the cause of the problem with the patient. Triggers to start a discussion for identifying the underlying problem were fluctuating clinical measurements, the patient looking physically unwell, frequent visits to the GP practice and also gut-feeling.

"If clinical parameters are not OK. If you see, well, the parameters are fluctuating, complaints or not. If people are not looking too well. You can see it in their faces." (Nurse, female, 58 yrs).

Discussion

This research explored medication management in patients with diabetes and the role of primary care providers. Patients' problems were mainly related to concerns about therapy and a negative attitude towards using medications, in addition to the previously reported causes of medication management problems, patients' dissatisfaction with therapy, drug related problems, and decision making about how to use the prescribed therapy.^{10–13,23,24} To share problems, patients had to feel comfortable with a healthcare provider. From a patient's perspective, nurse practitioners were found to put the most effort in establishing a good relationship with the patient, which can be expected from the frequency of contact between nurse practitioners and patients when acting according to the Dutch guidelines for diabetes mellitus in primary care.^{38,42} Patients perceived that pharmacy staff were the least involved in patients' well-being. This might explain why pharmacy staff found it difficult to sufficiently identify and address medication management problems among patients with diabetes. Communication and empathizing was not only perceived as important by patients to establish a good relationship, it was also deemed important by healthcare providers to identify medication management problems. Once a medication management problem was known to the healthcare provider and accepted by the patient as such, all healthcare providers found themselves able to respond adequately and provide appropriate support.

Workload

Workload includes all factors influencing the effort one must take to manage daily activities as was reported by Zullig et al., 2016.³⁵ No novelties were identified in our study that contribute to this part of the cycle of complexity model. In our study, patients indicated that they found themselves ways to implement medication use into their daily

routine. Most of the patients did not experience any problems with the practical side of using medications, with the exception of the occurrence of distractions or unexpected disruptions of daily routines. Also concerns and burden of side-effects were only mentioned by a minority of the patients. For healthcare providers practical problems were one of the main issues raised. An explanation for this might be that healthcare providers have contact with many patients. This study did not explore what proportion of patients experienced side effects and visited either the pharmacy or GP practice.

Nurse practitioners reported the importance of job stress and family on medication management. Increasing stress levels – either at work or at home – have a negative influence on life style and medication management. However, psychosocial work stress has not been reported to have a negative influence on glycemic control directly.⁴³

Capacity and resilience

Capacity and resilience include personal resources equipping patients to deal with medication management. The findings of the current study agree with the description of the Cycle of Complexity model.³⁵ Patients emphasized the importance of acceptance of the disease before being able to increase knowledge and social support. This was acknowledged by the pharmacy staff. Social support is an important factor for developing self-management among patients with diabetes.^{44,45} Concerns patients had about having diabetes, the treatment itself and medication use in general put a large burden on patients. General practitioners and nurse practitioners recognized comparable concerns in patients with diabetes. These concerns might influence patients' medication adherence. Once concerns were identified by healthcare providers, the cause could often be assigned to limited knowledge – sometimes in combination with low health literacy skills. This is confirmed by the studies of Fransen et al., 2015 and Ahola et al., 2013.^{2,4} In the current study, it seemed that low health literacy skills were associated with a lower willingness to accept information from healthcare providers. This was previously reported by both Fransen et al., 2015 and Heijmans et al., 2015.^{2,20} Especially older patients, lower educated patients and patients with multi-morbidities are at higher risk of low health literacy skills and as result of this might have lower self-management capacities.²⁰ Increasing patients' knowledge has a positive effect on their attitude towards medication use.^{28,46}

Access and utilization

The current study contributes to the framework cycle of complexity in the category 'access and utilization'. In this category the framework mainly takes into account the physical accessibility of healthcare facilities and the healthcare seeking behaviour of the patient.³⁵ There is no attention for the barriers perceived by patients when reaching out to healthcare providers. Results from the current study demonstrate the importance of adequate and appropriate communication skills of healthcare providers for discussing medication related problems. The attitude of the healthcare provider towards patients is crucial for patients to get the feeling they are welcome to address problems and ask for advice, otherwise they feel limited in their access to their care providers.

Communication between healthcare providers and patients about medication related problems can be perceived as difficult. Especially if patients do not address a problem themselves. A known problem in both general practice and the community pharmacy.^{47–49} Even more difficult is it to address sensitive topics like medication adherence. This requires a certain level of empathy and communication skills of healthcare providers and they need to take the time to have an open discussion with patients. Patients want to be felt understood by healthcare providers. Limited research has focused on communication between patients and healthcare providers and the influence on patients' outcomes.⁵⁰ Especially research about pharmacists'

communication skills and the effect on therapy is lagging behind.⁵¹ However, the importance of good communication of healthcare providers has already been acknowledged.^{52–54}

Strengths and limitations

This is the first study using a theoretical framework to explore healthcare seeking behaviour of patients with diabetes in the event of medication related problems. This framework provided guidance for a comprehensive and holistic approach of the exploration of medication related problems. So far studies have only focused on the type of medication related problems and the causes of medication related problems.^{10–13,24,33} Also, it provides in depth information about how primary healthcare providers identify and respond to medication related problems in patients with diabetes.

This study has also several limitations. Firstly, the recruitment of participants was challenging. Many healthcare providers indicated they had no time for an interview, which explains the limited number of GPs and pharmacy technicians included in the study. However, in combination with the interviews with pharmacists and nurse practitioners it was possible to reach saturation of the data. Recruitment of vulnerable patients was also difficult because most patients had to be approached through healthcare providers. After the interview, healthcare providers were asked to look for vulnerable patients with diabetes in their practice and to ask them if they would like to participate in the study. Since there was no benefit for the healthcare providers in this, healthcare providers had to be approached several times to hear back from them. Secondly, ideally patient interviews were conducted first followed by interviews with healthcare providers to get insight in the perceptions of healthcare seeking and providing in the same situation. Results from both parties on the same cases could have been even more complementary. In the current study, interviews with healthcare providers were followed by patient interviews. The included patients were not necessarily linked to one of the interviewed healthcare providers. Finally, the decision of reaching saturation of the data is arbitrary and made in a pragmatic way. However, due to the exploratory nature of this study, this seems a minor limitation.

Implications for practice

The results of this study show room for improvement in communication between patients with diabetes and primary care providers. Especially the communication with patients with low health literacy capacities deserves attention. The first step is to identify these patients followed by offering appropriate support.⁵⁵ Pharmacy staff should develop skills for actively approaching patients to identify and discuss possible problems, because they now mainly rely on medication adherence pop-ups from the pharmacy computer system. General diabetes care in the general practice could even be more shifted towards nurse practitioners to give general practitioners more time to spend on complex consultations. Not only communication skills are important but also attitude and providing privacy and understanding. Furthermore, close collaboration between general practitioners, nurse practitioners, pharmacists and pharmacy technicians can have a positive effect on patient outcome.⁵⁶ Though, also patients might contribute to more efficient consultations. In the Dutch system, GP appointments are made in advance through a GP's assistant. If patients provide sufficient information, assistants could perform better triage and make a better estimation of the length of the consultation necessary. Further research should focus on enabling patients on where to go with medication related questions, referral to appropriate healthcare providers and educating healthcare providers on communication skills to further increase patients' health.

Conclusion

Patients' problems and concerns were often related to a lack of knowledge or insufficient knowledge about medications and diabetes and might have a negative influence on patients' medication self-management. Patients experiencing medication related problems found support from relatives, peers and healthcare providers. The preferred healthcare provider was the nurse practitioner, because of the familiar and trusted relationship. Healthcare providers by healthcare providers relied on patients coming forward with a problem, computer notifications, clinical parameters and gut-feeling. All healthcare providers were able to offer support by means of practical support, education and involving caregivers in a patient's care. However, establishing a trusted relationship and sufficiently addressing of problems seemed to be the limiting factor in offering appropriate support.

Availability of data and materials

The datasets generated and analysed during the current study are not publicly available due to protection of participants' privacy but are available from the corresponding author on reasonable request.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.sapharm.2019.08.004>.

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